

# Serverless Python

Michael Bright  , Trainer @mjbright Consulting

26 January 2019, DevConf.cz, Brno

# About Myself

- British - living in Grenoble, in the French Alps
- Cloud Native Trainer *@mjbright*
- Docker Community Lead
- Python User Group Creator
- Kubernetes CKA
- Crazy about Open Source and Cloud Technologies

# Serverless Computing

1. **What Is Serverless?**
2. **Review of Cloud Provider Offerings**  
+CNCF Serverless WG
3. **Open Source Tools**  
Demo of Chalice/Lambda
4. **Open Source Platforms**  
Demo of OpenFaaS

# What Is Serverless?

## Serverless

- No more servers ?!
- The ultimate "Cloud Native" ?

## Serverless: a paradigm

- & a company
- & a tool

## FaaS + BaaS

- Functions as a Service
- Back-ends as a Service
- Functions glue together API-based back-end services

# Serverless - What Is it?

At the peak of the Hype Cycle!!

## NOT CARING ABOUT SERVERS

Developers focus on  
apps

Platform provider

- Provisions
- Auto-scales
- Maintains

## PAY AS YOU GO

- (\*) Pay for real (fn) usage
- (\*) No initial investment
- (\*) High availability for free
- Great for startups

## AGILE

- Short time to market
- Enables innovation
- (\*) Massive scale on demand

\* – These are the promises of Serverless

# Serverless - The making of ...

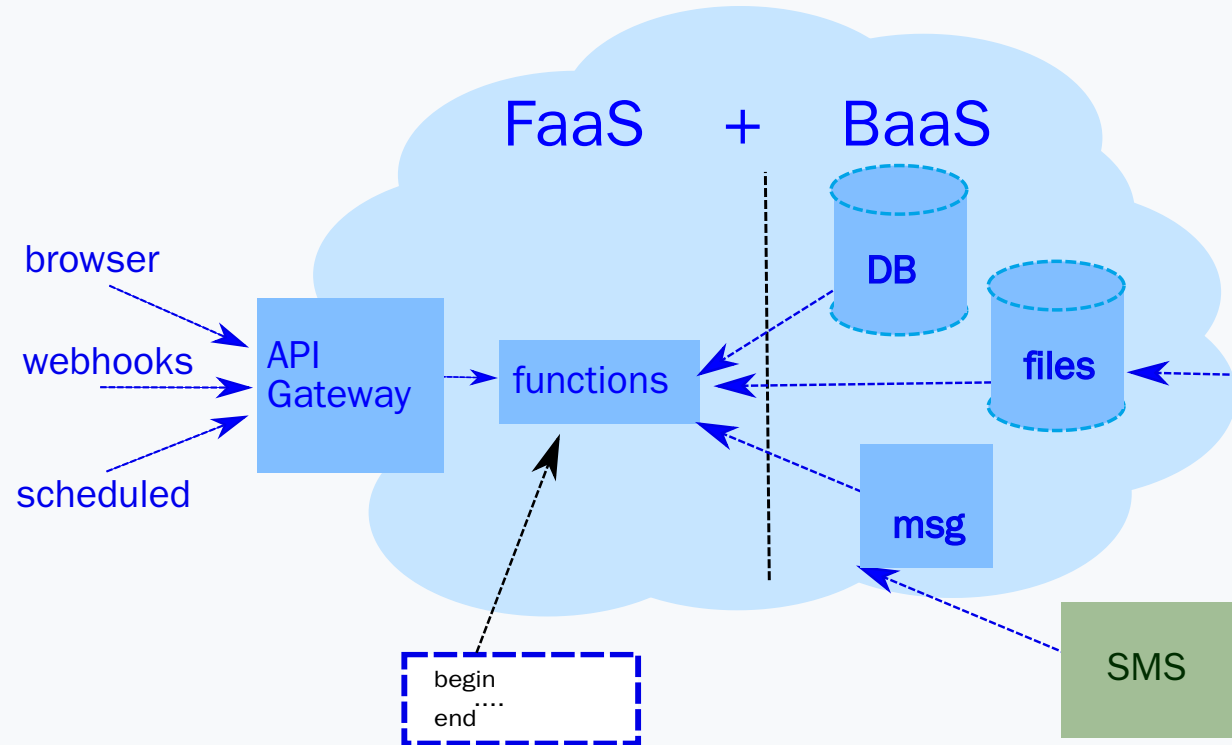


BAREMETAL



VIRTUAL MACHINES

# Serverless - an Event Driven Architecture





# Serverless - Cloud Providers



# Serverless - Main Cloud Provider Offerings



**AWS LAMBDA**



**AZURE FUNCTIONS**



**GOOGLE CLOUD FUNCTIONS**



**IBM CLOUD FUNCTIONS**



## AWS Lambda

Introduced  $\beta$ eta in Nov 2014  
Leader in developer uptake, back-end services and eco-system.

**Language choices:** Node.js (JS), Python, Java 8, C#, VB/F#

**NEW Features** [Reinvent 2017] - **Go**(static binaries) and **.Net(C#)**, **SAM for off-line debugging**

**Cost:** Free tier: 1 mn req/mth, then \$0.00001667/GBy-sec details

**Strengths:** Created the space, enormous ecosystem, Cloud9 IDE?

**Weaknesses:** A little slow, limited languages, lock-in



## Azure Functions

— *Introduced in 2016*

### ***Many language choices:***

**GA:** JavaScript, C#, F#, Python

**Exp:** Python, PHP, Typescript, Batch/Bash,  
PowerShell, Java

### **🔓 OpenSource runtime:**

<https://github.com/Azure/azure-functions-host>

**Excellent Developer Tools** Azure Portal,



## Google Cloud Functions

— *Alpha release in Feb 2016.*

### ***Language support:***

*Node.js/JS and Python(beta).*

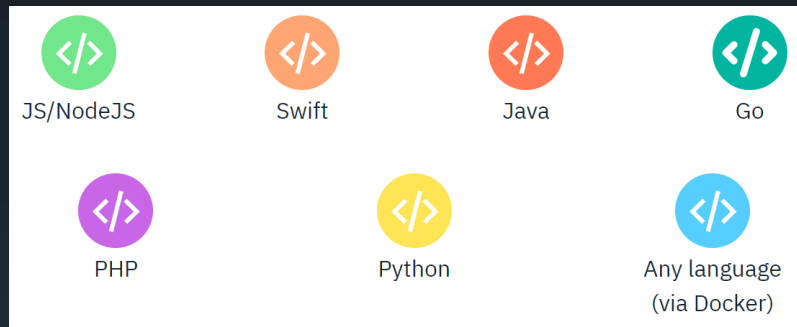


## IBM Cloud Functions

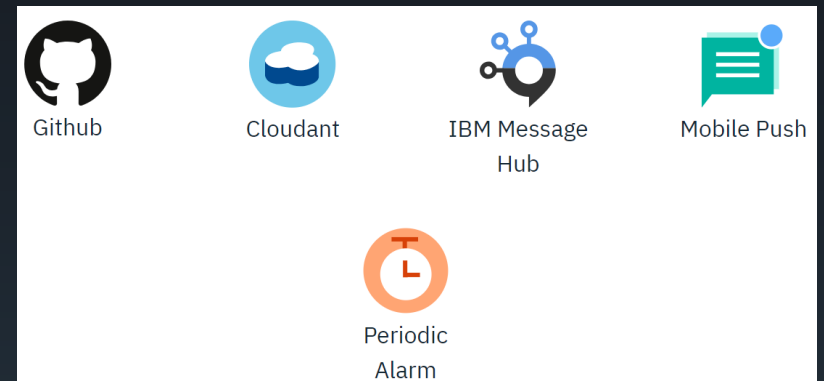
— *Experimental release in Feb 2016*

 **Open Sourced as Apache OpenWhisk** <https://github.com/apache/incubator-openwhisk>

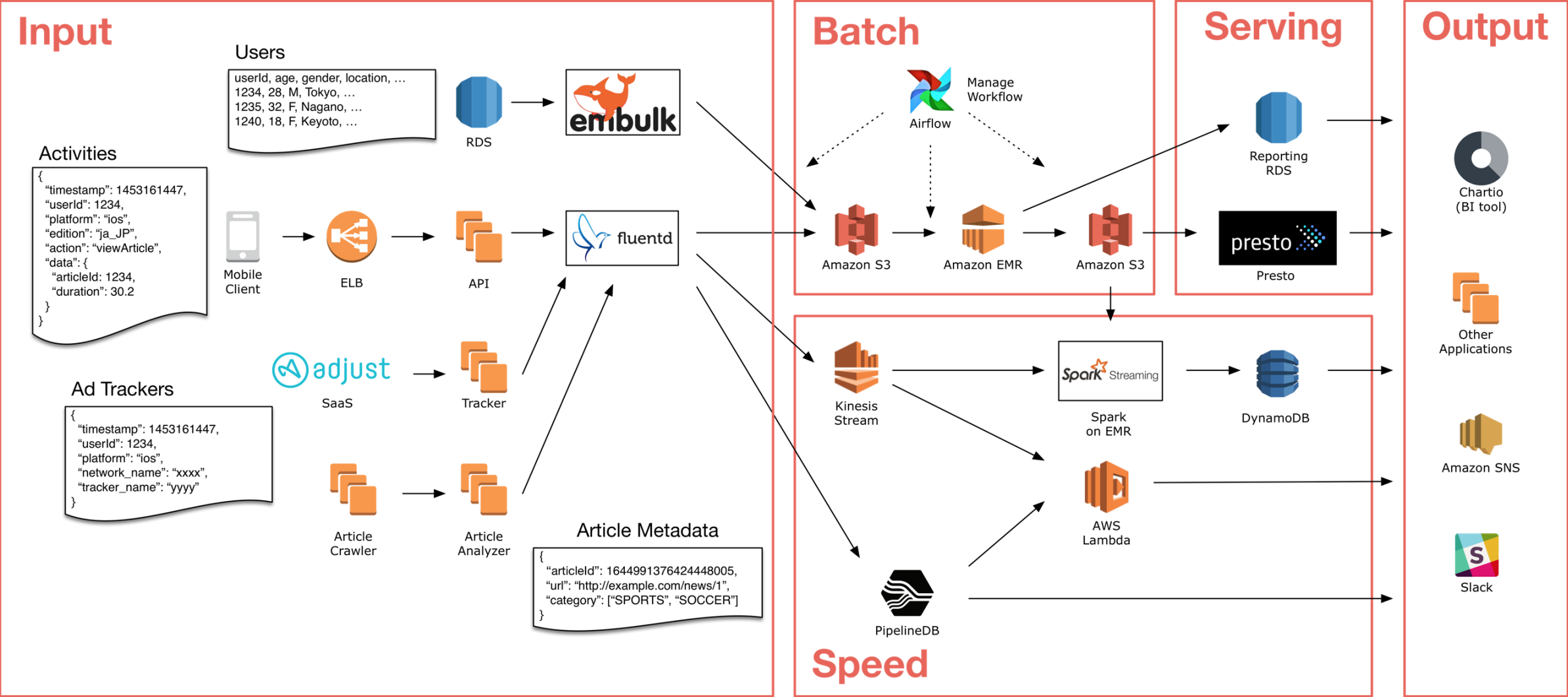
### Runtime support:



### Events support:



# AWS Lambda: Use Case - Smart News



Potentially **huge** cost savings for your business, or not ... **Source:**  
**"The hidden costs of serverless"**

# The CNCF Created a Serverless WG

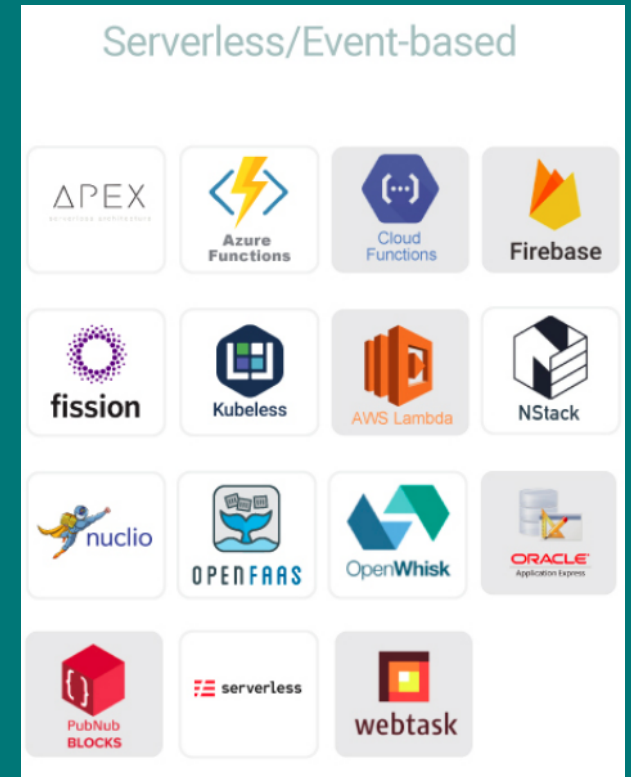
## We need open standards for Serverless

### The working group defines/identifies

- \* common terminology
- \* common use cases and patterns
- \* relation to PaaS and container orchestration

### Resources

- g *Serverless Whitepaper*
- 🐙 Github repository
- g Google group
- # Slack channel
- 📺 Meeting Videos
- g Meeting Minutes





# kNative

## Google released kNative in 2018

A framework for providing common facilities to Serverless platforms.

- Orchestrating source-to-container builds
- Event binding
- Traffic management
- Built on Kubernetes and Istio



# Serverless - Open-Source Tooling

Hundreds of Open-Source tools facilitate development, testing and deployment

See



*awesome-serverless*

Some tools seek to support multi-language, some multi-platform or a combination ...

Some Important Frameworks

*Serverless(.com)*

*apex(.com)*

*Zappa, Chalice (AWS Lambda/Python)*



## A Company, a Tool, an Open-Source Project

Deploys to various Cloud Providers/Open Source Platforms:

- AWS Lambda
- Azure Functions
- Google Cloud Functions
- OpenWhisk
- Kubeless
- SpotInst
- Webtasks





# Serverless Python !!



# APEX

APEX

## SUPPORTS:

Javascript

Python

++ Go

# Chalice

CHALICE

## SUPPORTS:

Python / Flask-like

# Chalice

Chalice

— *Open sourced by AWS - Python/AWS  $\Lambda$*

*pip installable module, command-line tool*

Demo Time - Chalice !

# Serverless - Open Source Platforms

**KUBELESS**

**FISSION**

**APACHE OPENWHISK**

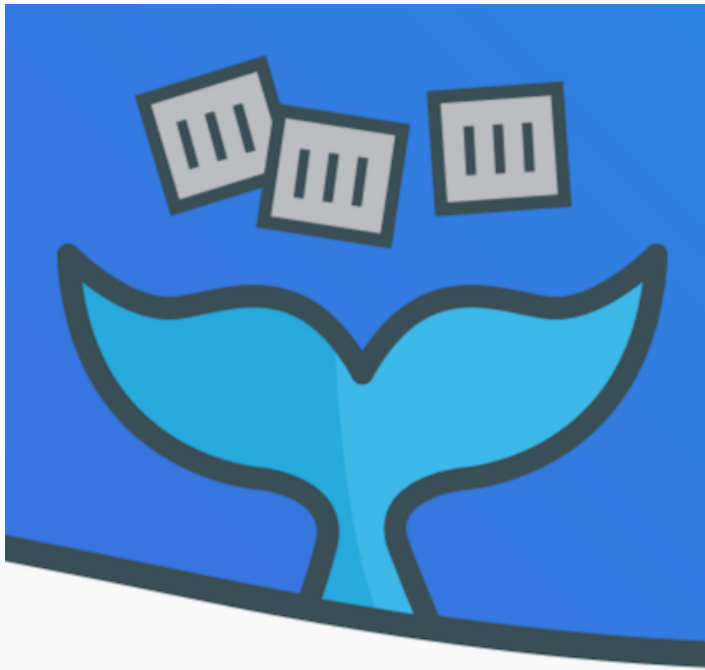
**OPENFAAS**

**FN PROJECT**

**NUCLIO**

**SPRING CLOUD FUNCTIONS**





## OpenFaaS

- OpenFaaS runs on Docker-Swarm or Kubernetes
- **Bring Your Own Container**
- Portal with Function Store
- faas-cli: command-line tool
- FaaS-Netes runs on Kubernetes
- A young project with a **vibrant community** of volunteers
- Easy to get started, many guides and blog posts from community
- Integrates Prometheus
- **OpenFaaS Cloud** initiative for GitOps

— Alex Ellis, Docker Captain, \*VMWare\*

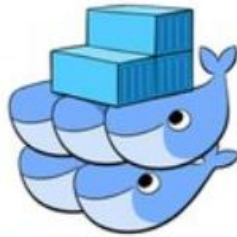
# OpenFaaS - Architecture

API Gateway

Function Watchdog



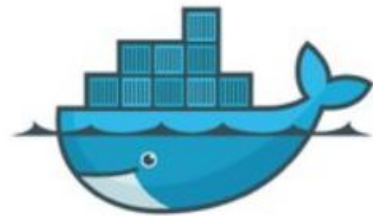
Prometheus



Swarm

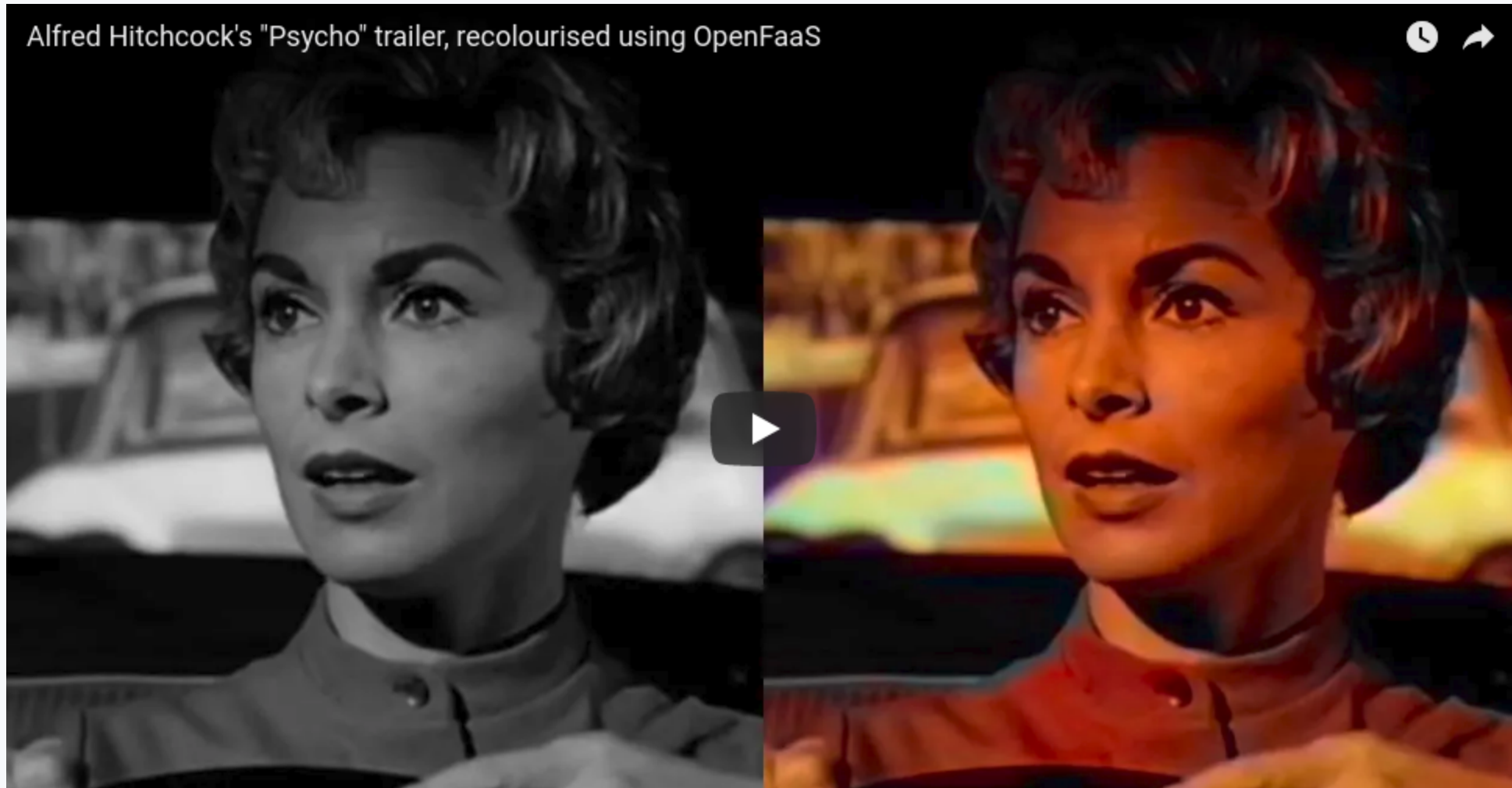


Kubernetes



docker

# OpenFaaS - Finnian Anderson, Colourising Video with OpenFaaS



# Demo Time - OpenFaaS !

# To Summarize

- Serverless is *still* a young technology
- It has a lot of promise for many workloads
- There are *real* **cost savings** to be made on opex and capex
- Major cloud players are investing in the technology
- There are many deployment choices today
- **We need an open cloud**

—

# Resources - 1

RESOURCE	DESCRIPTION	URL
Lists		
awesome-serverless	Curated list of awesome services, solutions and resources for serverless / nobackend applications.	[github] <a href="#">anaibol/awesome-serverless</a>
awesome-Serverless(.com)	Curated list of resources related to serverless architectures and the <b>Serverless Framework</b>	[github] <a href="#">JustServerless/awesome-serverless</a>
Tools		
Serverless	Tools for deploying to several Cloud Providers	[github] <a href="#">serverless/serverless</a>
Apex	Tools for deploying to AWS Lambda	[github] <a href="#">apex/apex</a>

# Resources - 2

RESOURCE	DESCRIPTION	URL
Cloud Providers		
AWS Lambda	Amazon's Serverless Platform	<a href="https://aws.amazon.com/fr/lambda/">https://aws.amazon.com/fr/lambda/</a>
Azure Functions	Microsoft's Serverless Platform	<a href="https://azure.microsoft.com/en-us/services/functions/">https://azure.microsoft.com/en-us/services/functions/</a>
Google Cloud Functions	Google's Serverless Platform	<a href="https://cloud.google.com/functions/">https://cloud.google.com/functions/</a>
IBM Cloud Functions	IBM's Serverless Platform	<a href="https://www.ibm.com/cloud-computing/bluemix/openwhisk">https://www.ibm.com/cloud-computing/bluemix/openwhisk</a>

# Resources - 3

RESOURCE	DESCRIPTION	URL
Open Source Serverless Platforms		
Kubeless	Serverless platform from Bitnami	<a href="#">url</a>
Fission.io	Serverless platform from Platform9	<a href="#">url</a>
Apache OpenWhisk	Serverless platform from IBM	<a href="#">url</a>
OpenFaaS	Serverless platform from Alex Ellis, Docker Captain	<a href="#">url</a>
Serverless Python Frameworks		
Apex	Serverless framework supporting Python and other languages	<a href="#">url</a>
Chalice	Serverless framework supporting Python / Flask	<a href="#">url</a>
Lambdify	Serverless framework supporting Python	<a href="#">url</a>
Zappa	Serverless framework supporting Python / WSGi	<a href="#">url</a>



♥ Thanks !

🐦 @mjbright